ENGLISH MULTICYCLES FOR THE BLIND

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English Multicycles for the Blind

By Frank C. Perkins

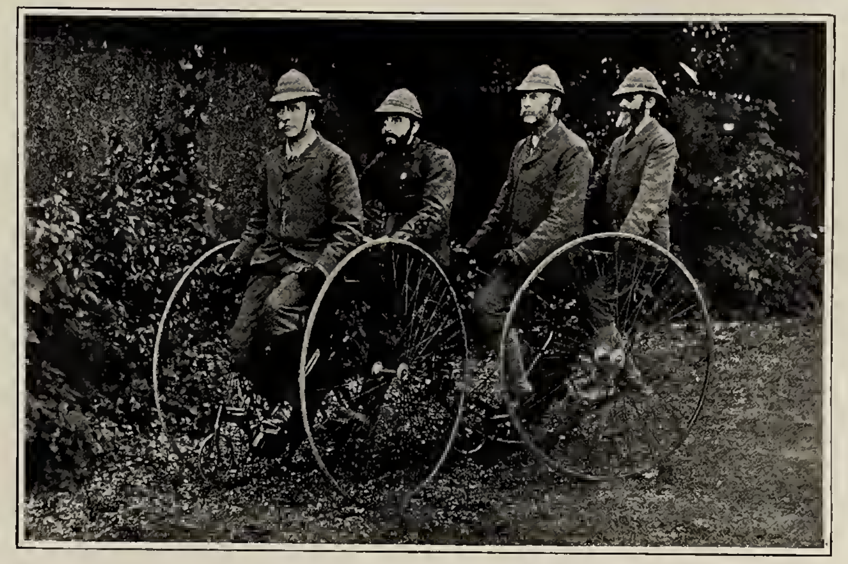
THE first multicycle used by the pupils of the Royal Normal College for the Blind was a Rudge Sociable cycle which Sir Francis Campbell obtained. When the double Sociable was developed two of these machines were obtained in 1884, and with two sighted persons to steer, the blind pupils often went on short trips. Sir Francis soon exchanged this Sociable for a tandem, and had two other tandems joined for a four-in-hand.

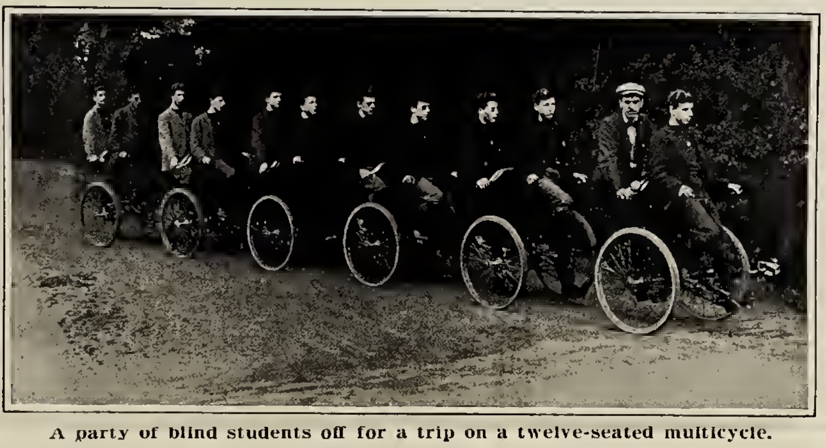
As it was important to have a machine on which one sighted person could steer for more than three blind riders, the multicycle manufacturers were asked to construct a machine to carry eight, and a number of experiments in couplings were tried. Sir Francis with his son and a practical member of the staff of the College for the Blind made several visits to Coventry to test the experimental machines. Finally a satisfactory one was built in 1888 and given to this College for the Blind through the help of Mrs. W. W. Astor, Mr. John Cook, and the principal.

The institution was soon provided with an addition of two six-in-hands, a four and a three, so that a party of twenty-seven blind people could be taken out for an afternoon run. The Singer military multicycle was then developed and a twelve-in-hand was built for the Royal Normal College for the Blind in 1893, and that machine is still in use. It has six pairs of wheels with two riders for one axle, and the six parts are connected by swivel and knuckle joints.

The latest multicycle seen in the photograph is very sensitive to the steering done by the second rider, and it will turn in its own length and can be divided into two sixes or three fours. Its length is 28 feet and it is geared to 51. With this multicycle runs have been made to Derby, Birmingham, Brighton and other towns. Until the motor traffic monopolized the roads, the machine was in constant use by the blind boys and girls and there was no outing they enjoyed more than a run on the Brighton road. There is a track of three laps to the mile in the grounds of this asylum for the blind, where the pupils practise.

For recreation at the Royal Normal College and Academy of Music for the Blind at Upper Norwood, London, England, a number of these college multicycles are used, as shown in the accompanying photographs. A team from this institution for the blind rode from London to Brighton and back, a distance of 100 miles, in 10 hours 45 minutes running time. The riders for this trip were chosen from 60 candidates. The length of the machine is 28 feet and the gear is 51. The second person steers this machine and the others simply propel the combination vehicle.


Two "Sociables" connected in tandem.

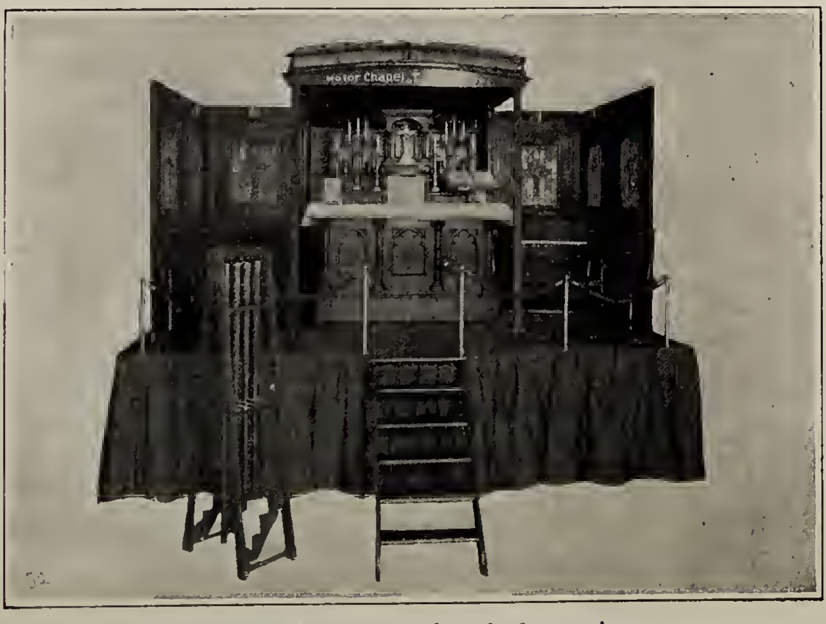

A party of blind students off for a trip on a twelve-seated multicycle.

A Chapel on a Motor Truck

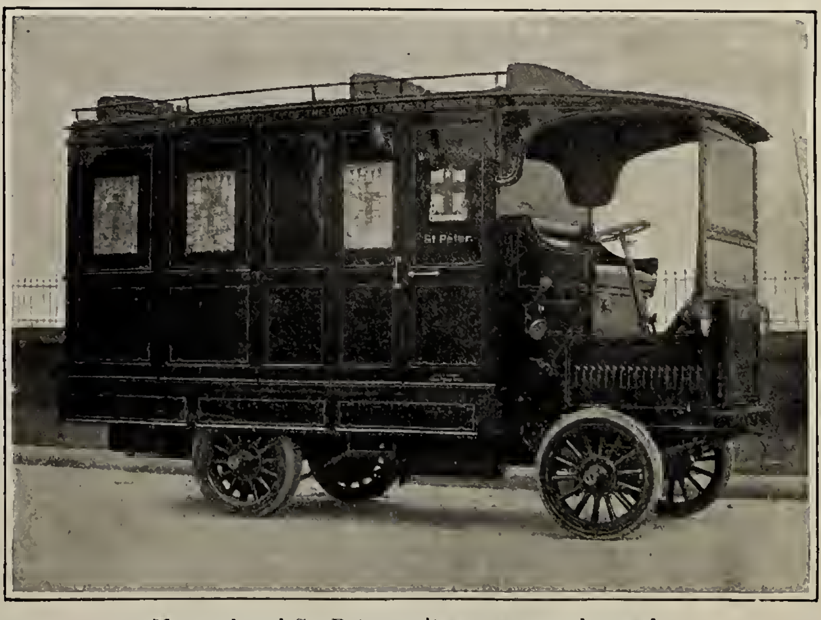
CHAPELS on wagons, on railroad coaches, on boats—we have heard of all of these; but a motor chapel—this is something new. Motor chapel St. Peter, it is called, and it was presented to the Catholic Church Extension Society by a member of a western branch of the Woman's Auxiliary. It will be used to penetrate sparsely settled regions that are beyond the reach of the railroad. Starting from Brownsville, Texas, the chapel, in charge of two priests, will work its way along the Rio Grande River westward through the State.

Mounted on a standard two-ton motor truck chassis, is all the necessary religious equipment. When the car is *en route* its somber gray finish, the eight cathedral windows with a cross design in the center of each, and the coat of arms of the society will distinguish it from commercial vehicles and give to it an appearance of individuality. When the car stops at a place for services, the rear door and hinged panels at the side open out and a drop platform is spread down, giving approximately double the floor space, thus forming a sanctuary of ample size. In the center of the platform extension is set a quartered oak combination altar and vestment cabinet with its ornamental brass accessories. Along the outer edge of the platform brass standards are fitted and provided with heavy silk cord guards. The floor of the platform is covered with a deep green Brussels carpet, and a green draped curtain hangs from the platform to the ground. To the right of the altar in one of the photographs may be seen a small folding organ, while in the foreground is a rack fitted with large tubular bells for outside use and a small chime for use at the altar. The equipment also includes a stereopticon, the power for the lantern being supplied by an electric lighting system, with which the car is completely provided. As a shelter from rain or the heat of the sun, a 20 by 50-foot gable roof tent with 7½-foot walls is furnished. When not in use, this is folded up and carried on the roof of the car.

Living quarters for two priests are provided in the forward end of the car. When the altar is not in use it is pushed to the extreme rear of the car, giving plenty of room for living quarters. In this forward space are contained lockers for personal effects, lockers for folding cots, bedclothes, drawers for books, stationery, a typewriter, cooking utensils, tableware, and a light supply of provisions. As many as three cots can be erected in berth style, suspended by means of brass chains, so that the priests and a chauffeur may be accommodated. In addition to this there are two extra army folding cots for use, when desired, outside of the car.



The chapel open and ready for service.



Motor chapel St. Peter as it appears on the road.

The Good Roads Movement

THAT there are upward of $400,000,000 of good roads bonds issued and outstanding is indicated by the Goods Roads Year Book of the United States, the 1913 edition of which has just been issued, containing a *résumé* of the whole road situation. It is evident that whatever may be the faults in methods of construction and maintenance, money is being spent in sufficient amount to bring about a vast improvement in the public roads. The Year Book shows $137,000,000 of State and road bonds authorized, and $156,500,000 of county bonds outstanding on January 1st, 1913, making a total of $293,500,000. As this is based on reports from about 75 per cent of the counties in the United States, and as a large number of the individual townships have not reported, it is estimated that the amounts not reported would run the aggregate up to probably $350,000,000, to which should be added ten or fifteen million dollars of the bonds voted in 1912, which have not yet been issued.

Gratifying progress in road construction during the past few years is indicated by the statement in the Year Book that while the percentage of all road improvement in the United States at the close of 1909 was 8.66 per cent, the revised statistics to December 31st, 1911, show an improved mileage of 10.1 per cent, or a net gain of 1.44 per cent. This does not sound so impressive in terms of percentage, but it means that in the two-year period more than 34,000 miles of improved roads were constructed, or 10,000 miles more than the entire mileage of national roads in France.

The Ghent Food Congress

AT the Ghent international exposition which opens in April there will be held a Congress of food adulteration and like subjects. An interesting feature is a section where will be exhibited natural products in raw and purified state along with imitations or different kinds of adulterations. Model laboratories where food products are manipulated will also be seen by the public. Numerous lectures illustrated with lantern or moving picture projections, form another attractive feature.

Engineering

Progress on the Cape Cod Canal.—It is estimated that the 25,000,000 tons of shipping which rounds Cape Cod during the year will be so far benefited by the opening of the Cape Cod Canal that it will be perfectly willing to pay a toll for the use of the canal. The 11,000,000 tons of coal shipped annually to eastern ports will find the inner and sheltered route of great advantage and probably the greater part of this, or such part as is carried in barges, will avail itself of the canal.

Decline in Relative Strength of the American Navy.—Already the United States Navy has lost the second position in rank among the naval powers. Germany has surpassed us, and now we are confronted with the probability of having to give place to France, whose navy under the new administration has taken on new life and is advancing by leaps and bounds. The relative positions of the two fleets in 1916 will be France, ten dreadnoughts, the United States, eight; France, seven superdreadnoughts, the United States, five. In that year the total displacement of dreadnoughts and superdreadnoughts will be 376,000 tons for France and 310,000 for the United States.

Switzerland Buys the St. Gothard Railroad.—The acquisition of the St. Gothard railroad by the Swiss government has been advanced by the ratification by the National Council of the St. Gothard Railway Convention of 1909, by which the St. Gothard railway passes into the hands of the Swiss government. The company is paid $42,500,000 for the railroad, and in addition the government takes over the debt of the company, which amounts to $23,418,000. This line, one of the most famous engineering works in the world, was the first to introduce those famous loops built entirely within the body of the mountain.

A School Which Pays Its Scholars.—For six years the apprentice school at the Lehigh Valley Coal Company's shops at Drifton has been in successful operation. It is held for one hour twice a week during working hours, and a novel feature is that the scholars are paid at their regular rates for this time. Attendance is compulsory for all apprentices. They are instructed in the applied mathematics of mechanics, freehand drawing, correspondence, and all subjects useful to them in their craft. One of the earliest scholars could neither read nor write, yet to-day he is considered one of the best workmen in the shop. The average attendance is about twenty, and the course is pronounced by visitors from nearby institutions of learning to be both efficient and complete.

Over-taxation Limits Size of Cities.—In a recent issue of the *Wall Street Journal*, attention is drawn to the fact that the final determining factor in the growth of cities is the taxation, which history has shown us tends to run to very high and burdensome limits in the greatest and most rapidly growing cities of the world. Attention is drawn to the fact that Mommsen has shown that the water-tax receipts proved that in the time of Hadrian the population of Rome was not less than 1,400,000. To-day it is less than 400,000, and our contemporary draws the conclusion that the people were taxed out of the city. London has slowed down in its rate of growth, and attention is drawn to the fact that increasing taxation, due to the very costly works of improvement now being undertaken, may ultimately act with similar effect on the city of New York.

Sixteen-mile Tunnels Through the Rockies.—One of the most striking developments of present-day engineering is the great expense which the railroad companies do not hesitate to incur in building tunnels of unprecedented length with a view to decreasing their grades across the mountain summits. The latest announcement in this connection is that of the Canadian Pacific Railroad, which states it is going to undertake the construction shortly of a tunnel that will be by far the longest yet constructed. It is to be built below its pass through the Rocky Mountains. It will be 16 miles in length and will cost $14,000,000. This is some four miles longer than the well-known Simplon Tunnel through the Alps and the estimated time of construction is seven years.

Figures of a Four Days' Rainstorm.—The Weather Bureau estimates that in the four days' rainstorm which devastated certain towns and villages in the upper watershed of the Ohio River, sufficient water fell to cover fifteen million acres of land to a depth of one foot. This represents between five and six thousand billion gallons of water. In the presence of such eccentricity of nature, the works of man, whether they be restraining reservoirs or artificial banks or what not, become mere pygmies and utterly futile for restraint. A four-day rainfall which will cover such a State as Ohio with a depth of seven inches, is a phenomenon of nature which is beyond all possibilities of control by any appliances that are known in the present stage of engineering knowledge. All we can hope for is to mitigate disaster. Absolutely to prevent it would probably call for works of a magnitude which is utterly beyond our present ingenuity and resources.

Electricity

Wireless Telegraphy Across the Bering Sea.—It is reported that arrangements are being made between our Government and that of Russia to maintain a wireless telegraph service across the Bering Sea. This will complete the girdle of radio-telegraphic communication around the world.

Electricity from Sawdust.—The city of Vancouver, British Columbia, has been greatly annoyed by the smoke from sawmills and lumber mills. To overcome this nuisance, a company has been formed to supply these mills with electric power. As fuel for the generating plant, however, it is planned to use the sawdust from the lumber mills' waste heaps. As the power is obtained in this way from a waste product, electricity can be furnished at greatly reduced rates, and not only is the smoke nuisance abated, but the problem of disposing of enormous piles of sawdust is also solved.

Threading Conduits Pneumatically.—A new apparatus has been designed for threading conduits. It has the advantage of being able to pass around several bends which would be difficult if not impossible with the ordinary fish-tape method. A "traveler" is provided which consists of a series of washers loosely fitting the interior of the conduit. This traveler is connected to a string or cord which passes through a tube into a compressed-air tank where it is coiled up on a reel. In service, the tank is first filled with air to a pressure of about 20 pounds by means of a hand pump, then the traveler is inserted in the conduit, the end of which is sealed by a plug on the end of the tube, and a valve is opened, permitting the air to pass out into the conduit and blow the traveler through, drawing the string with it. This string is then used to draw wire which, in turn, may be used for hauling a heavy cable through the conduit.

Sterilizing Milk with Ultra-violet rays.—The Bureau of Animal Industry has been carrying on a number of experiments at Washington, D. C., in the use of ultra-violet rays for the sterilization of milk. The milk is spread out in a thin layer by means of a drum revolving at high speed, which picks up the milk from one trough and conveys it to another. While on the drum it is subjected to the ultra-violet rays. Then it is picked up from the second trough by a second drum and conveyed to a sterile flask. A quartz mercury-vapor lamp generates the ultra-violet rays to which the thin film of milk is exposed. It has been found that by this treatment the bacterial contents is greatly reduced. However, when the milk is exposed for a sufficient length of time or in a film thin enough to produce a much larger reduction in the bacteriae content, it is given a disagreeable flavor which renders it unfit for the market.

Electrolysis and Concrete Reinforcing.—The effect of electrolysis on the iron reinforcing rods of concrete was demonstrated at the recent Cement Show in Chicago, by an exhibit of the National Bureau of Standards. It was shown that local currents are set up in the iron due to moisture and impurities, producing iron oxide, which, as it occupies a much larger volume than the iron, exerts a pressure that eventually results in cracking the concrete. To determine the amount of this pressure, a steel cylinder with a bore of 1.5-inch internal diameter was fitted with a steel rod of one-inch diameter and the space between was filled with cement. This was then immersed in water and the iron core was connected to an electric circuit. By measuring the expansion of the outer cylinder it was found that the oxidation of the iron core produced a maximum pressure of 4,700 pounds per square inch. A column of concrete, one foot long and six inches in diameter and provided with an iron core, was immersed in water and subjected to fifty volts with the iron core as the anode. In three hours time the specimen was cracked. A bulletin on these experiments is being prepared by the Bureau of Standards.

Self-lighting Kinetoscope.—By the use of a small dynamo mounted along with the crank mechanism of a moving picture machine, the Pathé firm of Paris are now able to produce a machine which is self-contained and furnishes its own current for the lamp. This makes an independent apparatus which can be set up anywhere and is at once ready for use. Where a current supply is not at hand, this will be very convenient. The idea is being applied in a simplified apparatus of recent design, and it is intended to be used extensively in homes or schools, as the picture machine is now recognized to have an educational value, besides giving recreation. One point which lessens complication is the use of an over-volted metallic filament lamp, and by increasing the current much above the standard the lamp gives a very bright light, thus projecting a good image on the screen. Such a lamp will burn for 8 or 10 hours and can be replaced very cheaply. Thus the usual arc lamp, which amateurs may find more difficult to work, is not needed here. The new machine also has incombustible films of prepared celluloid, of somewhat smaller size than the standard. In this way the machine is well within the reach of amateurs, as now there is scarcely anything to be attended to.

Science

The Tercentenary of Logarithms.—The Royal Society of Edinburgh is planning to hold an international mathematical congress in June, 1914, to celebrate the tercentenary of the publication of John Napier's "Mirifici Logarithmorum Canonis Descriptio." The entertainments will include a garden party at Merchiston, of which Napier was laird.

The Names of the Minor Planets, or Asteroids, since the number of known bodies of this class began increasing by leaps and bounds, with the introduction of photographic methods of search, have furnished astronomers with the opportunity of commemorating all sorts of persons and things, mythical and otherwise. One of them, No. 594, has just been named Mireille, after the heroine of a celebrated Provençal poem by Frédéric Mistral. This name was proposed by Camillo Flammarion (of course!) and has been accepted by Dr. Max Wolf, who discovered the planet in question in 1906.

Meteorological Work of the "Scotia."—In connection with the forthcoming ice-patrol of the North Atlantic which is being organized by the British Board of Trade and several steamship companies, it is announced that the vessel to be used for this purpose, the "Scotia," will carry a trained meteorologist, and that upper-air observations will be made by means of kites and kite-meteorographs, which have been supplied by Dr. Assmann, director of the Lindenberg Observatory. It is also announced that the wireless equipment of the vessel has been furnished free by the Marconi Company. Two wireless operators will be carried. The vessel will be stationed off the east coast of North America, to the north of the usual shipping routes, to watch the break-up of the ice and report on its movement toward the shipping routes.

A "German-South American Institute" has been founded, with headquarters at the Technical High School in Aix-la-Chapelle, for the purpose of furthering both intellectual and commercial relations between Germany and Latin America. The ambitious programme of this institution includes the interchanges of literature, especially periodical publications; the publication of directories and handbooks for the countries concerned; the preparation of German, Spanish and Portuguese editions of appropriate works on the arts and sciences, and so on. The Institute will be divided into a large number of sections, according to countries and subjects, and each member will affiliate with one or more of these. Further information on this subject may be obtained by addressing the "Geschaftsstelle des Deutsch-Sudamerikanischen Instituts," Kgl. Techn. Hochschule, Aix-la-Chapelle, Germany.

The Highest Mountain Climb.—The account of the Duke of the Abruzzi's expedition to the Karakoram and Western Himalaya in 1909, just published, reports some remarkable altitudes attained by the party. According to the *Geographical Journal*, the Duke undertook this expedition chiefly to contribute to the vexed problem as to how high it is possible for human beings to climb. He and his guides, after living for 37 days at or above 16,000 feet, spent another 17 above 18,000 feet, of which 9 were spent at or above 21,000 feet. In an attempt on Bride Peak, the party camped at 22,483 feet, and the next morning climbed to 24,600 feet—thus carrying the "man-level" 700 feet higher than any previous mountaineer. Only a heavy mist prevented them from reaching the summit (25,110 feet). The most remarkable part of the story is that the party did not suffer from mountain sickness, and were little the worse in any way for their exertions. Apropos of this fact an interesting series of letters on the subject of mountain sickness, from correspondents in various parts of the world, has been appearing for some months in the *Geographical Journal*. There are few subjects on which opinions differ more widely.

Primitive Art.—The numerous discoveries in the way of mural paintings and drawings of paleolithic caverns which have been made in Europe of late are well *resumed* and illustrated in the recent publications made under the auspices of the Prince of Monaco, and the two volumes relate to pictorial art of the epoch known as Magdelenian. The first discoveries made at Altamira, Spain, in 1872, were followed by many others, and these confirmed the existence of a quaternary art of remarkable value. Systematic researches in a great number of caverns showed that this art was spread over other regions, for instance in France, where M. Riviere published the drawings from the La Mouthe cavern in the Dordogne region. Handsome and large-sized polychrome frescoes then came to light in the Combarelles and other caves which belonged to the same family. Then a careful study of the subject was taken up and the publication decided upon, owing to the Prince of Monaco's liberality. Messrs. Capitan, Breuil and others who were active workers, now determine the form and position of the caverns, then give a description of the ornamentation, and draw a parallel between the animal forms and those of existing animals or of animal remains which we possess.